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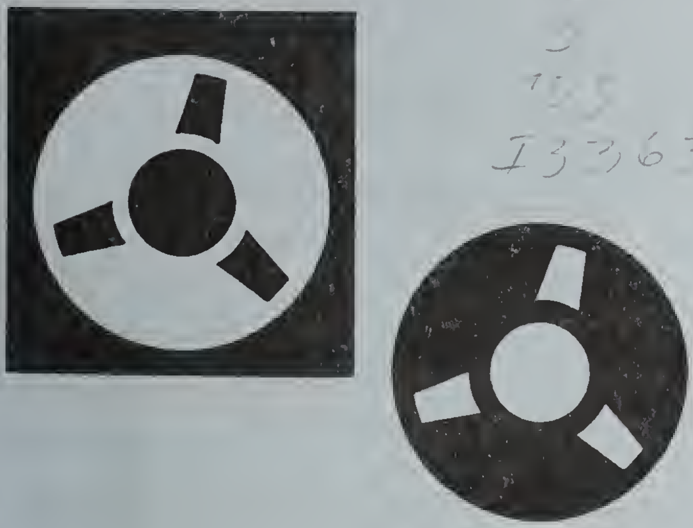

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University of Toronto

COMPUTER SCIENCE

NEWSLETTER

No. 98

Edited by Mr. C. Alan Ford

Date March 30, 1973

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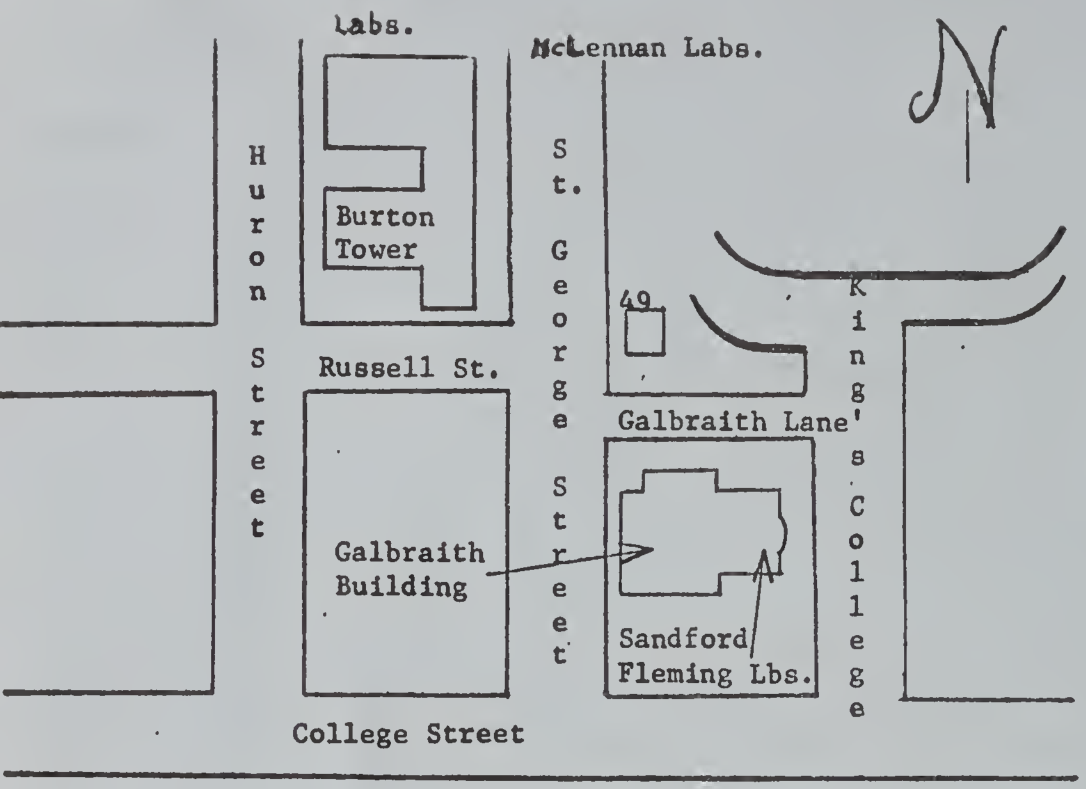
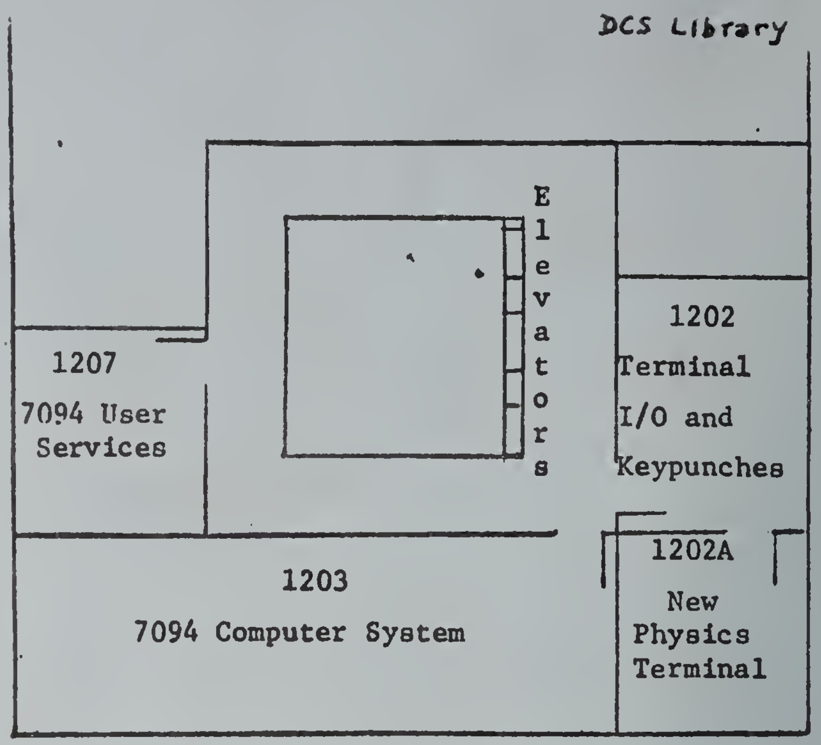
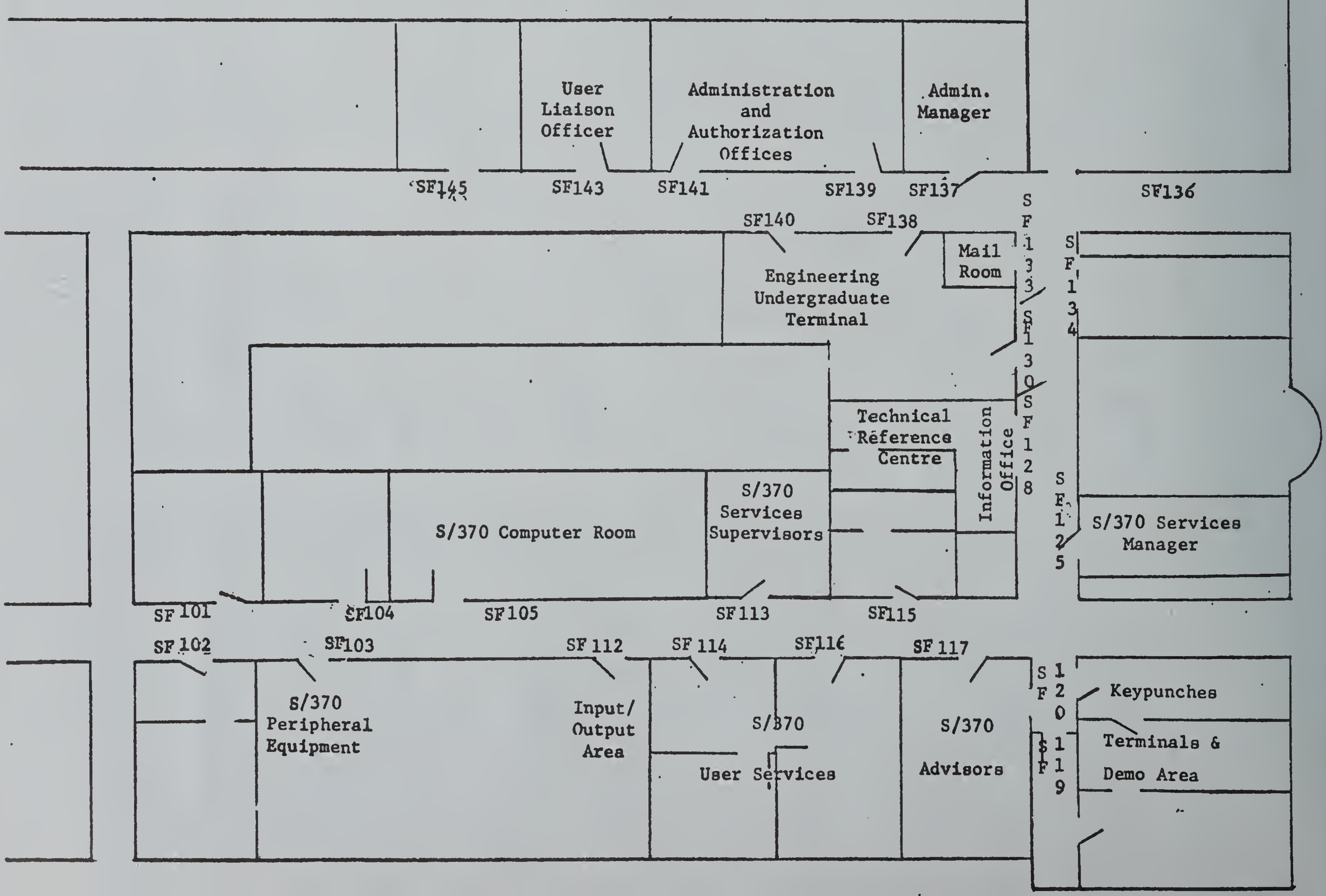




FLOOR PLAN: 12th Floor Burton Tower

FLOOR PLAN: UNIVERSITY OF TORONTO COMPUTER CENTRE

SANDFORD FLEMING LABORATORIES



SHARE XL

C. A. Ford

The University of Toronto was well represented at SHARE XL in Denver, Colorado, from March 4th through March 10th. The conference of IBM system users contributed to the widening knowledge of how to manage present large scale OS systems and how to prepare for the forthcoming Virtual Storage and Virtual Machine systems. VS and VM presentations by IBM and by early users showed that many virtues should become available with the new systems, overcoming longstanding technical shortcomings of OS/MVT. Two areas of concern are how to account for usage of a VS machine and the degree in which applications programming expertise can affect user and computer efficiency.

University of Toronto people attended or participated in session and project work ranging from computer measurement and evaluation through computer graphics. J. R. McBride, Manager of the Computer Research Facility, is now in charge of a SHARE graphics project. Your reporter continues as manager of a project on product evaluation.

The next semi-annual conference, SHARE XLI, will be held in Miami Beach in August.

SWITCHING AND AUTOMATA THEORY SYMPOSIUM
CALL FOR PAPERS

The Fourteenth Annual Symposium on Switching and Automata Theory, sponsored by the Switching and Automata Theory Committee of the IEEE Computer Group and the Computer Science Department of the University of Iowa, will be held in Iowa City, Iowa on

October 15, 16 and 17, 1973.

Papers describing original research in the general areas of switching theory, automata theory, and the theoretical aspects of computers, computation, and programming are being sought. Authors are requested to send seven (7) copies of an extended abstract (not a complete paper) by

May 7, 1973,

to

Dr. H. R. Strong
IBM Thomas J. Watson Research Center
P. O. Box 218
Yorktown Heights, New York 10598

Authors will be notified of the acceptance or rejection of their papers by June 25th.

PERSONNEL CHANGES

J. Schick

The Computer Centre welcomes three new staff members this month. Joining S/370 Services are Winston Davis, computer operator, and Arlene Steele, keypunch operator. Arlene has worked for us for several months on a part-time basis and we now welcome her to our full-time staff. Barbara Watkins is the new secretary to the Director.

PEOPLE IN THE COMPUTER CENTRE

Stan Yagi

This is the first of a series of articles intended to better acquaint users with UTCC personnel.

Mr. Herb Kugel is a Technical Consultant with the User Services Group in S/370 Services.

Herb received his B.A. in Mathematics at California State College in Los Angeles. He has been involved in software development in aerospace industry, private consultant firms and a large computer manufacturing corporation.

At UTCC Herb has been involved in system generations, software development and user consulting. Herb is currently the senior OS/HASP consultant for users of the System /370 Services. He is also interested in user aids and diagnostic tools.

Herb has published many articles in computer trade magazines on various software applications in the computer field.

Herb invites all interested users who are considering or now involved in projects which require complicated OS/HASP interfaces to contact him at 928-7286.

DEPARTMENT OF COMPUTER SCIENCE

C. Phillips

Symposia for Secondary School Teachers

The Department of Computer Science will again hold Saturday Symposia for secondary school teachers on March 31, April 14, and May 5, 1973. Anyone interested in Computer Science or Data Processing in the high schools is cordially invited to attend.

Registration may be made for any or all of the Saturday Sessions by contacting Mrs. Corley Phillips, Department of Computer Science, or calling 928-4058.

Programme

Saturday, March 31:

"Testing and using random-number generators"
Professor C. Crawford

A discussion of useful properties of random-number generators and how to test for those properties. Examples will be presented which show the use of a variety of probability distributions.

"Would you believe in structured FORTRAN?"
Professor T.E. Hull

A description of a pre-processor developed at the University of Toronto which allows FORTRAN programmers to use techniques such as IF-THEN-ELSE, DO-WHILE, and CASE constructions.

"Information structures and their computer representation"
F. Tompa

Various data structures such as arrays, queues, stacks, and trees will be presented as aids in explaining algorithms. Their implementation in the computer will be discussed.

Saturday, April 14:

"Workshop on graphics"

Subprograms for basic picture manipulation, which include translation, scaling, and rotation, suitable for high school students, will be presented.

Mr. Crowly and Mr. Lieberman, of North York, are high school teachers whose students have written similar subroutines. They will present some of the work done by their students.

There will be an opportunity for participating teachers to try working with the graphics subroutines in WATFIV on the High Speed Job Stream.

Tours of the Computer Centre will be scheduled during the day.

Saturday, May 5:

"Data processing education - ideals vs reality"
Professor D. Shanno

Professor Shanno is cross-appointed with the Faculty of Management Studies and has taught a Computer Science data processing course using the case study method. He will express his views on data processing education.

"Communication via programming languages"
Professor P. Roosen-Runge

The use of language as a means of communicating between people, and the use of programming languages as a means of communicating between man and machine.

"Use of minicomputers in secondary schools"

A panel discussion and open forum on minicomputers.

FUN AND GAMES

C. A. Ford

Try it out, friends!

University of Toronto

DEPARTMENT OF GEOLOGY · TORONTO 5 · CANADA

February 19, 1973

Mr. C. Alan Ford, Editor
Computer Science Newsletter
U.T. Computer Centre

Dear Mr Ford

Enclosed is a communication we received on our newly-installed magnetic card selectric typewriter terminal. Some of your readers might be interested in trying to decipher it.

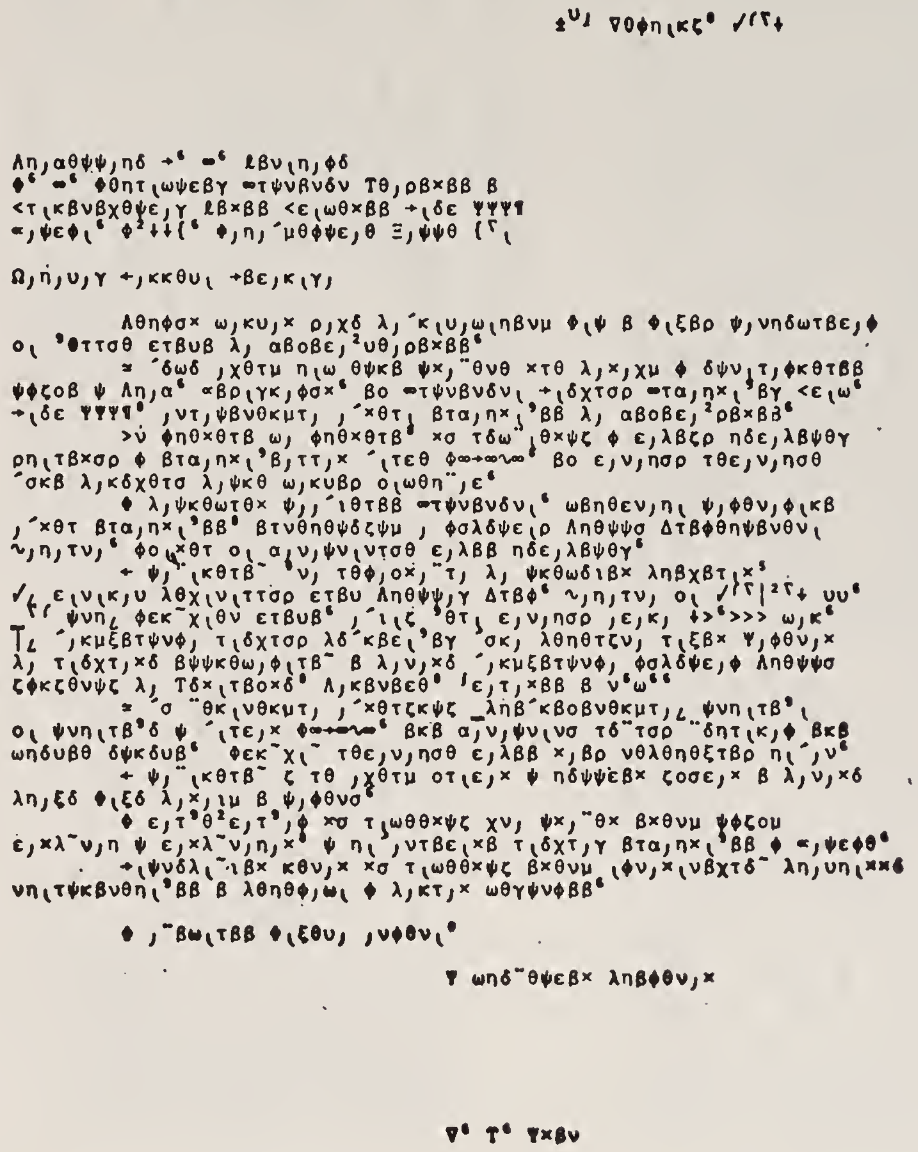
Sincerely yours

F. G. Smith

F.G. Smith
Professor

FGS

Enclosure



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S/370 APPLICATION SOFTWARE

William Hayes

National Computer Program Abstract Service

In the interests of the growing number of application software users, we have subscribed to National Computer Program Abstract Service. The NCPAS Program Index Newsletter categorizes over 8,500 abstracts into over 100 specific program subjects. A copy of the most recent Newsletter (No. 3—Winter 1972) has been placed in the Information Office on the Application Software Documentation shelf. Requests for abstracts may be referred to S/370 User Services.

Quadratic Modelling System

QMS solves mathematical programming problems involving linear constraints on all variables with a quadratic objective function to be optimized. The method is general for least squares fitting involving linear constraints. Rand Corp report R-516-RR constitutes a user's guide for the program. A copy of this report has been placed in the Information Office on the Application Software Documentation shelf. Our thanks go to George Comrie of Industrial Engineering for bringing this program to our attention and providing us with the source code.

HASP

L. Lubin

HASP is an integral component of the system software on the S/370-165. Because of its unique interaction with the operating system and its modular structure HASP is an ideal place for the System Support Group to insert local modifications to the system to enhance its functional capabilities. Previous modifications have improved the High Speed Job Stream, given us multiple copies of OS print data sets and trailer page accounting.

Several more modifications are in the development stage. One of these, autobatching, is intended to support improved operability and efficiency in the High Speed Job Stream function. Another, EXECUTOR, would improve the efficiency of processing most Class A jobs. A third would attack the problems of turnaround which beset Class B or C jobs. Preprocessing of tape and disk setup requests could speed the processing of B or C jobs markedly.

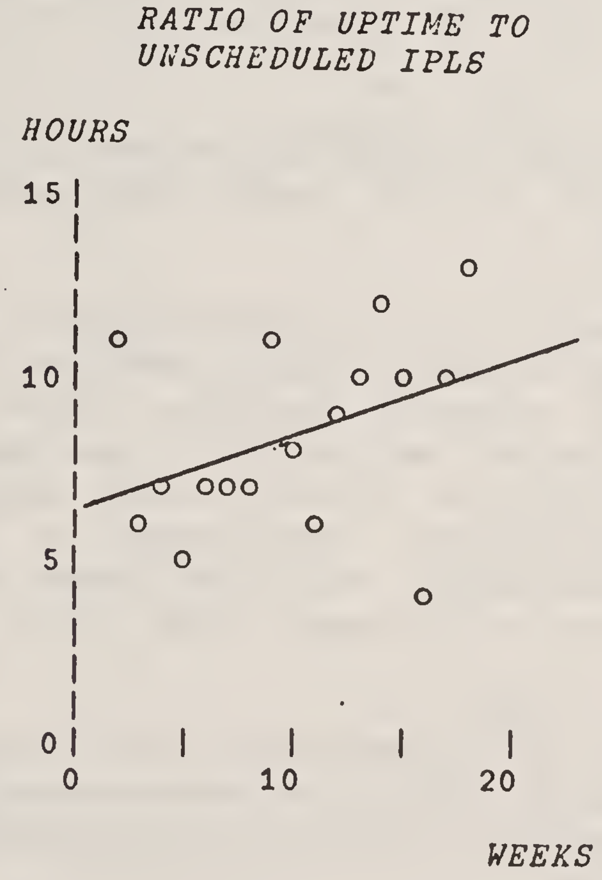
Watch these pages for the continuing story of HASP system improvements. Watch the USERBOOK update notices for official technical information about these new user-oriented features.

SYSTEM/370 RELIABILITY

C. A. Ford

Modern computer systems are complex mixtures of hardware devices and software. They are also sensitive to the skills of their operators and the user-programmers. With many jobs or services to be provided for simultaneously, reliability is both hard-won and absolutely essential. Ninety percent uptime, once an acceptable standard for older one-job-at-a-time machines, would now be thought disastrously poor. Our S/370-165 has been averaging better than ninety-seven percent uptime since last September.

Not only should a computer have a good uptime record; it needs also to fail infrequently and, of course, recover quickly. We maintain a data file which permits a quick look at the relationship between scheduled uptime per week and the number of unscheduled system restarts (Initial Program Loads). A plot below illustrates 17 recent weeks of experience. Barring one recent bad week, the behaviour of this measure is desirably favourable, as the fitted trend line shows. Over the whole period illustrated the average time between unscheduled IPLs was over 7.5 hours. This value is a good approximation of the classical "mean time between failures"



LEVELS OF SERVICE FOR GENERAL PURPOSE S/370 WORK

C. A. Ford

The S/370 General Purpose Job Stream offers to the user three levels of service at which any job may be submitted. Jobs are classified also according to the physical computer resources required. Class A jobs make the least demands on these resources while B and C jobs are much more demanding. Efforts continue toward reducing the impact of this fact, the slowness of turnaround of C jobs compared with B's and B's compared with A jobs.

An index of service called Overall Service Factor has been kept under study since July of 1971, when the S/360-65 computers handled the GPJS load. Three plots illustrate its behaviour. Figure I shows 21 months of it, where OSF (%) equals 100 times the nominal value of a month's service (priority factors included) divided by the value of the service if at standard priority (PR=6). Figure II shows the throughput rate by month. Figure III shows how OSF relates to the throughput rate.

Sizeable variations in jobs per hozr may be seen as not producing significant changes in OSF since the earlier months of S/370-165 service.

OSF is now being reported out by the system hourly. On the basis of a limited number of daily reports, what we see seems fairly obvious. If standing backlogs exist, a condition we can call "relative saturation", the users immediately move their aggregate demand toward higher priority. Relative saturation occurs occasionally in the forenoon, more often in midafternoon. For three recent days the 24 hour values of OSF were in the range from 86.5% to 96.5%.

The design objective of the system was that OSF average out around 100% for a system which we would consider reasonably well loaded. Right now the S/370 seems somewhat underloaded, by that criterion.

There is no way for a computer to remain always below relative saturation, short of being vastly overpowered for around the clock operation. We are happy that our priority scheme seems to meet your need for a relief valve under busy conditions by keeping the Priority 8 rush work unbacklogged even in most cases where queues of jobs of lower priority jobs exist.

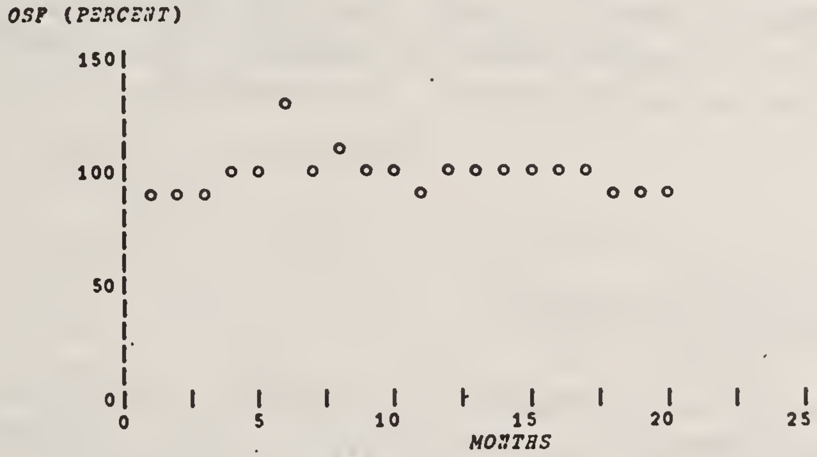


FIGURE I

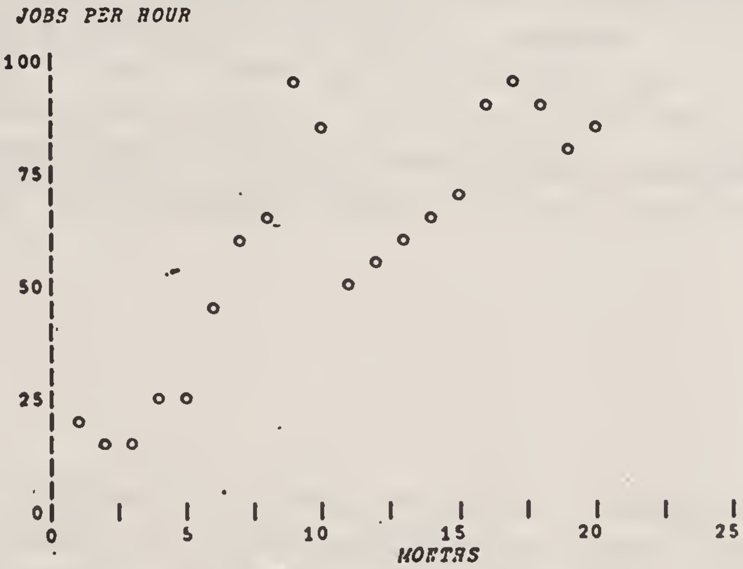


FIGURE II

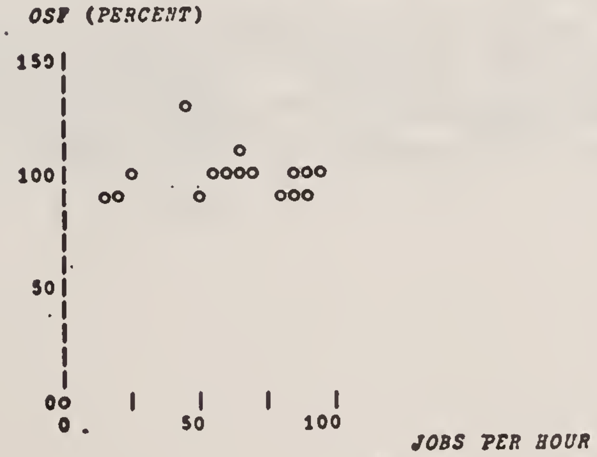


FIGURE III

HIGH SPEED JOB STREAM DEVELOPMENTS

Mark Tapia

High Speed Job Stream News Implemented

In order to inform users more quickly about bugs in the various compilers, at ASUT and EUT a section of the bulletin board near the card reader has been reserved for High Speed Job Stream news. At other remote terminals, the news will be posted by the terminal supervisor. All notices are dated and will be removed when a new one is issued. The distribution of the current news is speeded by a computer run which prints the current news at the terminals.

More Processors Being Considered

ASSIST, an assembly language processor developed at Pennsylvania State University, and LISP, a list processing language, are candidates for addition to the repertoire of the High Speed Job Stream. Both processors are being studied carefully for their operational and functional compatibility with the HSJS service. ASSIST was designed as a student assembler. LISP, now available to users of the regular OS batch stream has been described earlier in this Newsletter.

HSJS Advising

Programming advisors are on duty at the EUT and ASUT terminals for eight hours on weekdays and, at ASUT, seven hours on Saturdays. During these hours they assist users to interpret error messages and to offer advice on programming technique. They relay to the staff of UTCC all indications of faults in the language processors and, where appropriate, help guide users to other UTCC areas or staff members.

From September 1972 through February 1973 the advisors answered 18,726 queries covering all HSJS processors. Over 52% of these queries concerned PL/C. Almost 35% were about WATFIV. Assembler G and SPITBOL weighed in at about 5% of the activity. Interestingly, in December of 1972 the percentages of the actual number of PL/C and WATFIV jobs run were almost exactly opposite to the number of queries. Is PL/C more intricate, bug prone, or just unfamiliar than WATFIV, one wonders.

The annual turnover in advisors, recruited from student ranks, is high. The pay is good and the work interesting. To apply, see Mr. Mark Tapia, Room SF114, Sandford Fleming building.

WATFIV CALCOMP Routines Available

A UTCC version of PLOTTEST, the University of Waterloo's WATFIV CALCOMP simulator, is now available through the High Speed Job Stream. These routines allow calls to CALCOMP routines and produce printed rather than plotted output, assisting the user to debug CALCOMP jobs. A handout containing details and restrictions of the PLOTTEST package is available from the Information Office. Entitled WATFIV CALCOMP, this manual will be incorporated in USERBOOK Section 3.

Any user experiencing difficulty with the package should contact Mark Tapia at 928-7109.

PAPER TAPE

R. Radcliffe

The current version of the paper tape program is being rewritten to incorporate various changes based on suggestions made by users. Any further suggestions for changes should be submitted (preferably in writing) to Room SF116 Sandford Fleming.

TEXT360

R. Radcliffe

TEXT360, an off-line text editing system is available on S/370. Although similar in purpose to ATS, it differs in that it requires card input and operates in a batch mode, whereas ATS requires a dedicated 2741 terminal which operates on-line. Although ATS is far easier to use, TEXT360 does offer more control over the format of the final document. TEXT360 also may be of interest to those users who cannot afford a terminal and the associated connect time costs.

Features offered by TEXT360 include: single and/or double column, justification, page width or height variation, horizontal and vertical ruling (for tables), spelling checks, hyphenation, table of contents, footnotes, document updating with revision bar marking.

If enough interest is shown, a seminar will be held to explain how to use the system.

PLOTTING SOFTWARE

R. Radcliffe

In order to plan future additions to plotting/graphics software, user needs in this area should be made known to User Services. In order to get feedback from users, a plotting software request form has been provided. This form may be used to request additional software, or changes to existing software. Copies of the form may be obtained from Miss Lynne Jenkins, Room SF113 or from remote terminal supervisors. All completed forms will be answered.

User Services will also support user contributed software felt to be of general use. This support will consist of documentation distribution and load library maintenance. Copies of documentation should be sent to Room SF116, Sandford Fleming.

ON CURING A CALCOMP SERVICE PROBLEM

R. Radcliffe

Over the past few months, CALCOMP users have been plagued with 001 abends. Because of the failure of users to report these problems promptly, User Services has had difficulty in pin-pointing the problem, and in fact did not realize that there was a problem for some time. The problem has been fixed, and traced to a user using old versions of the CALCOMP routines at the same time as the current ones. Requests that users not accessing the current routines contact User Services were not answered, making it more difficult to isolate the problem.

Please give us more feedback, so that we can give better service.

CALCOMP EXTENDED FUNCTIONAL SOFTWARE

R. Radcliffe

The CALCOMP graphics functional software package consists of a group of routines for performing common plotting functions. The subroutines within the package will provide for drawing circles, arcs, ellipses, spirals, dashed lines, grids, polygons, fitted curves, bar-graphs, calendar axes, business axes, logarithmic axes, log lines, shading lines, arrows, arrowheads, dimension lines, centre lines.

The package also contains a main line program for drawing keypunch forms, card layouts, tape formats, etc.

A reference copy of the documentation will be available in Room SF117 and at the Information Office, Room SF128. Users who have an immediate need for the information may obtain Xerox copies. The information will eventually become part of USERBOOK.

CALCOMP PRODUCTION

D. Gibson

Coloured Ballpoint Pens Available

Green, blue and red ballpoint plotter pens are now available on a trial basis. It is hoped that coloured ballpoint ink will offer a better alternative than coloured India ink in many situations. Several advantages of ballpoint are: setup is faster and neater, reliability of the pen is greater; and the plotter may run in zip mode. The foregoing results in faster overall turnaround for all jobs. In addition ballpoint ink is less prone to fading.

Presently there are a few users debugging plots in India ink. Please refrain - use black ballpoint, it results in faster turnaround for plots which are probably going to end up in the garbage anyway. Setup time is reduced and zip mode may be used (if you are using zip mode and India you are probably getting a sloppy, "skippy" plot - we can't help that - so use ball point and get a decent plot). We will gladly run plots in India ink - but please use it only when necessary. Thanks for your co-operation.

TAPES AND TAPE DRIVES

R. Cox and S. Yagi

Our new tape drives have been in service for three months now and to date our experiences with these drives have been excellent. Many users have converted to using 1600 BPI processing during this period. To those of you who continue to use 800 BPI density, may we recommend that you give serious consideration to creating future tapes at 1600 BPI density. The advantages are several:

1) 1600 BPI tapes are recorded in PE (phase encoded) mode which is a superior method of writing records on tape. This system is less prone to I/O errors when reading or writing.

2) there is a saving of tape when you write at 1600 BPI. How big this saving is depends on how you have blocked the tape, of course, but you will always save some amount, and this will allow you to write larger or more files per reel of tape.

In addition, the 3420 tape drives are superior to the older 2400 series drives in several ways. They are faster and more reliable mechanically. They are also self-threading which is easier on your tape in general. The rewind phase of these drives is designed so that tape snapping is much less likely to occur. The drives tend to remain somewhat cleaner as well, which is also beneficial for your tapes over long periods.

A word of warning: the remaining two 2400 series drives will be removed from service after May 1, 1973. This should have no effect on the great majority of our users, but we are aware that a few users are requesting 2400 drives by OS address. We suspect this is because these users wish to ensure that their tapes are always processed at 800 BPI, and they do not wish to make large numbers of changes to their DCB sub-parameter lists to insert DEN=2 sub-parameters. To help you get around this, S/370 User Services has written a utility which will insert the DEN=2 sub-parameter into your JCL statements or procedures wherever you have specified UNIT=2400 if you so desire. For further information about this, please see the adviser in SF103. All job costs for this will be assumed by us, by the way.

We hope that all users will make the effort to convert to 3420's as soon as possible. If you do elect to use 1600 BPI, remember that 1600 BPI tapes can only be read or written on 3420's and you should specify UNIT=3400-3. The DEN subparameter may be omitted for 1600 BPI tapes.

Again, we recommend 1600 BPI density. We feel this is the superior way of reading and writing tape. Don't try to mix densities on the same tape, though, as the system will reject your tape. For a fuller explanation of the do's and don'ts of dual densities, see USERBOOK or SSB #63:72 or the IBM JCL Reference Guide (form #GC28-6704).

UNUSED TAPES IN THE TAPE LIBRARY

R. Cox

S/370 Services is currently experiencing difficulties in providing tapes and tape storage to users because of physical limitations on the space that is available to store tapes in the tape/disk area of SF106. We realize that most tapes stored in the library or rented from us are used or are expected to be used. Our records show us, however, that some tapes have not been used for a substantial length of time. We would appreciate it, therefore, if users who are renting tapes which they no longer need would release these tapes so that they may be re-assigned. Similarly, users storing foreign tapes which they do not intend to re-use at S/370 Services could help us by removing these tapes from the library.

Please do not worry about future availability of storage space in your decision to remove or release tapes. Should you wish to rent other tapes or resubmit foreign tapes in the future, we will continue to be able to offer this service.

Please contact Ms. Sylvia May in Room SF109 (telephone 928-7319) should you require any further information or assistance.

THE HELP DIAGNOSTIC PACKAGE

Herb Kugel

One of the major difficulties facing the programmer is the problem of debugging his coding. While the IBM Abnormal Termination dump is quite useful in most cases, there are times where the dump is not really helpful or is not obtained. This can be true in the case of overlay problems and also in the case of user data difficulties such as divide checks and overflows.

Normally, in the case of FORTRAN for example, an IHC error message is issued and processing continues when there is a data problem. Unfortunately, the message is not readily capable of informing the user exactly where or in which of his routines the arithmetic error took place unless he himself does some hex arithmetic. The problem can be especially compounded if the program is in the overlay mode and the user has made an error in his Linkage Editor overlay control statements and thus in the overlay structure itself. UTCC has implemented an OVERLAY analyzer and is now in the process of combining this tool with another product obtained from the SHARE library, the HELP diagnostic package.

The HELP package, together with the OVERLAY analyzer, helps interpret OS/370 diagnostic information and produce written output in plain, easy to understand English.

It does this by analyzing interrupts and printing the type of interrupt along with the name of the CSECT in which it occurred. The package obtains all this information by trapping Linkage Editor output and obtaining all necessary reference data. In addition, it also reformats the Linkage Editor output into clear, readable English.

The package has many other useful features:

a) the ability to snapshot an entire routine at any given time during execution.

b) should the job abend, the dump is reformatted to remove all the extraneous abend data usually not needed by the problem programmer.

The package is currently under initial analysis and the results seem positive. If a user is interested in "experimenting" before formal documentation is defined for the USERBOOK, please phone Herb Kugel at 928-7286.

LISP AVAILABLE

Mark Tapia

A modified version of the LISP compiler from Stanford University is now available. LISP is a list processing language which has been used extensively at the Massachusetts Institute of Technology and at Stanford University for work in Artificial Intelligence including graphic support.

Basically the modification allows the programmer to trap errors which would normally generate an error message and then to continue processing, by using the function ERRORSET. In this way LISP interpreters can be coded with error recovery mechanisms.

The new compiler includes the following features:

1. full LISP 1.5 compatibility including the compiler and the assembly language LAP.

2. the ability to save a LISP core image and restore a LISP core image.

3. the ability to simulate a large LISP machine by saving and restoring either all of binary program space or only certain sections.

4. the ability to run LISP in various regions of core.

We are investigating the possibility of placing LISP on the High Speed Job Stream to complement SPITBOL which is a string manipulation language.

For details on the compiler, telephone Mark Tapia at 928-7109.

SPECIAL FORMS

D. Gibson

A revised method of requesting special forms will be announced shortly through Hotnews, USERBOOK, and Newsletter. The change will be transparent to most users of special forms except that additional combinations of trains, forms, and carriage control will become available as "STANDARD SPECIAL" forms. Users of certain facilities (e.g. TN trains, labels and user submitted forms) should pay special attention to forthcoming announcements. Those users who are submitting their own forms are requested to call Laurie Soul at 2914 at their first convenience, since some renumbering of forms is necessary. Please give Miss Soul your name, address, phone number and the number(s) of the user-supplied form(s) you are presently using. We will let you know shortly thereafter what your new number will be.

CREDIT REQUESTS

R. Cox

In the January 31 newsletter, it was predicted that the percentage of jobs run that would be submitted for credit would rise. This prediction was based on our previous experiences with new equipment installations and user conversions. As it turned out, we were right in our predictions but for the wrong reasons. During January and February, we experienced 15 claims resulting from a card reader problem. Eighteen CalComp software claims also helped to inflate the submission rate. Both these gremlins have now been chased down and fixed. But the new 3420 tape drives are proving quite serviceable. Together with our conversion assistance to users, this has kept tape problems to a minimum.

The table below gives a breakdown of credits granted for the months of January and February.

	January	February
Hardware	20	14
Software	23	30
Human	15	18
Total	58	62
# of jobs	39659	40982
% of jobs	0.15	0.15

UPDATES ISSUED FOR USERBOOK SECTION 3

Janet Campbell

Pages added, and/or replaced by updates:

February 16/73 --	3.4	3.4130-3*	
	3.4020-3	3.4285	
	3.4020-4	3.4295	
	3.4100	3.4295-2*	
	3.4125	3.4295-3*	
	3.4130-2*		
	3.9903-11*		
February 20/73 --	3.6210*	3.6220-2*	3.6230*
	3.6214*	3.6220-3*	3.6290*
	3.6216-2*	3.6221*	3.6290-2*
	3.6216-3*	3.6224*	
	3.6220*	3.6224-2*	
March 9/73 --	3.2-2*	Temporary Updates Only	
	3.2-3*		

* new page

THE BROWNBOX INFORMATION RETRIEVAL SYSTEM

D. Flower

The Interactive Systems Group of the Computer Centre has developed an information retrieval package for APL. This Brownbox (as opposed to blackbox) system consists of a set of functions that greatly simplify information system writing for a variety of applications. Data can be stored in a record format where each record consists of a group of fields. Fields can be either character or numeric and either fixed or variable length. The presence of any particular field in a record is entirely optional. Any field can be inserted into or deleted from any record at any time. When a field is not present it takes up no space in the record.

The system automatically maintains indices over all fields the user declares as indexed. An index allows the user to retrieve records by specifying the contents of a field in the record. The user does not have to know the location of the record. For example, a student's record could be retrieved merely by specifying the student's name.

When two or more people are simultaneously working with the same set of files, the system maintains file integrity through the use of a sophisticated interlock mechanism. A variant of this same mechanism provides the user with a backup capability - if a mistake is made while altering a file, the file can be completely restored to its original state simply by typing 'OUT'.

System security allows detailed control of a user's access to the files. A user can be given read and/or write access on a field by field basis. That is, a user could be given read access to some fields in a record, write access to others, and no access at all to the remainder. Different users can be given different access permissions.

Technical documentation is still in preparation. However, persons interested in additional advanced information for their own current planning activity should contact Mr. Doug Flower at 928-3787.

INTERACTIVE SYSTEMS RELIABILITY

S. Goldfarb

The uptimes achieved in February for each of APL, ATS, and CPS were 99.80%, 99.81% and 99.82%, respectively. The total number of scheduled hours of operation during the period February 1 through February 28 was 454. In addition to the scheduled hours of operation, APL, ATS and CPS were available during approximately 110 hours of unscheduled weekend time.

The following table summarizes the time lost out of scheduled hours of production. There was one late start due to hardware maintenance; the time lost was 3, 7 and 8 minutes for APL, ATS and CPS, respectively. The table shows the time lost due to system failures for each of the systems: three unscheduled IPL's were required as a result of the failures.

DATE	DOWNTIME (mins)			REASON
	APL	ATS	CPS	
Mon. Feb. 5	7	9	12	*Solid Wait State (undetermined)
Tue. Feb. 6	26	-	-	APL Workspace Recovery (human error)
Thu. Feb. 8	10	11	12	*Solid System State (undetermined)
Thu. Feb. 8	12	14	16	*Machine Check (hardware)
Mon. Feb. 19	-	7	-	ATS User Lockout (software)
Wed. Feb. 28	-	3	-	SOF1 Abend (software)
Totals	55	44	40	*IPL Required

System Failures February 1 to February 28, 1973.

GENERAL NEWS

J.R. McBride

CRF Users' Meeting

The February CRF Users' Meeting was held in Room SF 2689, Sandford Fleming Laboratories, at 3:00 p.m. on Friday, 23rd February, 1973.

J.R. McBride acted as chairman and answered users' questions.

The main topic discussed was the merger of the Computer Research Facility and the University of Toronto Computer Centre. Mr. McBride answered questions regarding the effect of the merger and assured the users that the present level of service will be maintained after the merger.

The next CRF Users' Meeting will be in Room SF 2689, Sandford Fleming Laboratories, at 3:00 p.m. on Friday, 23rd March, 1973.

CRF - UTCC Merger Agreement

The CRF-UTCC Merger Agreement was presented to the CRF Policy Committee at a meeting on Wednesday, 28th February, 1973. The committee approved the agreement in principle, subject to some minor additions.

The agreement will be presented at the next meeting of the CRF Policy Committee for final approval by that committee.

Easter Holidays

The CRF laboratory and offices will be closed on Friday, 20th April, 1973, for the Easter Holidays.

The CRF laboratory will close at 8:00 p.m. on Thursday, 19th April, 1973, and will reopen at 9:00 a.m. on Monday, 23rd April, 1973.

Visitors to the CRF Laboratory

The following people visited the CRF laboratory between February 9th,1973, and March 9th, 1973.

Prof. P.H. Roosen-Runge (Department of Computer Science, University of Toronto), Mr. T. Vangel (Ontario Institute for Studies in Education, Toronto), Miss B.P. Watkins (Toronto), Mr. C.A. Ford (University of Toronto, Computer Centre), Mr. H.C. Parnham, Mr. P. Dernick, Mr. Chris Gans and Mr. Al Janes of the Data Processing Management Association, Mrs. Judith Hindley-Smith (Toronto), Prof. Larry Shampina (Scandia Laboratory, Albuquerque, New Mexico, United States), Mrs. Tuula Vangel (Toronto), Miss Marjorie McLeod (Toronto), Miss Martha Jackson (Toronto), Prof. R. Holt and 5 visitors from Canadian General Electric, Peterborough, Mr. E.J. Smith (Scarborough), Mr. R.E. Palter (Toronto), Mr. W. Berry, Mr. C. Trussler (Peterborough), Mr. W. Raffan (Guelph), Mr. Ray Van Raamsdonk, Mr. Heinz Hiob, Mr. Ed Hyduke of Control Data, Canada.

SUMMARY OF TAPE RECORDING FACILITIES AT CRF

CRF has added to its range of audio and instrumentation tape recorders. These units, which are listed below, are now available for rental from CRF.

a) Philips ANA-LOG 7 Instrumentation Recorder

The ANA-LOG is a 7 channel unit which records analog signals on 1/2" magnetic tape. Any channel may be used to record data directly (DR) or to modulate a high frequency carrier (FM). The maximum frequency response in DR mode is 250 to 100,000 Hz and in FM mode, DC to 10,000 Hz. Four tape speeds (15/16, 3 3/4, 15 and 30 ips) are provided, making the recorder useful for time scale compression or expansion. The ANA-LOG 7 is especially suited for the researcher presently involved in multi-channel recording of analog signals on strip chart recorders, and later punching cards manually from the chart, or for any researcher wishing to record fairly high speed analog data for future analysis by a computer.

The ANA-LOG 7 can be powered from 110 V. ac or 12 V. dc.

The rental rates for the ANA-LOG 7 are:

Hourly	20 Research Units
Daily	90 Research Units
Weekly	360 Research Units
Monthly	900 Research Units

b) Hewlett-Packard 3960A Instrumentation Recorder

The H-P 3960A is a 4 channel unit which records analog signals on 1/4" magnetic tape. The unit records and reproduces signals in the FM mode only. The maximum frequency response is DC to 5,000 Hz. Three tape speeds are provided (15/16, 3 3/4 and 15 ips) making the unit useful for time scale compression or expansion. The 3960A is smaller and lighter than the ANA-LOG 7 and will be useful to researchers who require up to 4 channels. The unit can be powered from 110V. ac or 12V. dc. It is very suitable for recording experimental data in remote locations.

The rental rates for the H-P 3960A are:

Hourly	15 Research Units
Daily	50 Research Units
Weekly	200 Research Units
Monthly	500 Research Units

c) TEAC R-70 Instrumentation Recorder

The TEAC R-70 is a very small, light, portable, 4 channel recorder which records on high quality cassette tapes. Any channel may be used in either a direct (DR) or FM mode. The maximum frequency response in the DR mode is 100 Hz to 8 k Hz, and in the FM mode, DC to 800 Hz. Only one tape speed, 1 7/8 ips, is provided. The unit weighs only 14 pounds and can be powered from internal batteries, external 12 V. dc or 100 V. ac, thus making it very useful for recording data in moving vehicles or in remote, on-site locations.

The rental rates for the R-70 are:

Daily	30	Research Units
Weekly	120	Research Units
Monthly	300	Research Units

d) SONY TC-330 Audio Tape Recorder

The SONY TC-330 is a stereo audio tape recorder, complete with playback amplifiers and speakers. The unit is really 2 recorders in one, in that it can handle both standard 1/4" tape on 7" reels and standard cassettes. The cassette section operates at the standard speed of 1 7/8 ips, and the reel-to-reel section has speeds of 1 7/8, 3 3/4 and 7 1/2 ips. The maximum frequency response for the reel-to-reel section is 30 to 18,000 Hz, and for the cassette section, 50 to 10,000 Hz. Tapes may be recorded from either cassette to open reel, from open reel to cassette, or from any input service to either cassette or open reel.

This recorder could be useful to researchers involved in computer aided voice or music analysis and generation.

The unit is powered only from 110 V. ac. The rental rates for the TC-330 are:

Daily	10	Research Units
Weekly	40	Research Units
Monthly	100	Research Units

UTCC DIRECTORY

	ROOM	PHONE 928-
DIRECTOR		
John C. Wilson	49 St.Geo	6496
ASSISTANT DIRECTOR		
C. Alan Ford	49 St.Geo	2991
USER LIAISON OFFICER		
Bill Greene	SF143	2694
Information Office	SF128	4990 or 4991
ADMINISTRATION MANAGER		
Jerry Palter	SF137	8948
AUTHORIZATION CLERKS		
Nancy Pocock (S/370 + 7094)	SF139	8702
Yvonne Davis (Interactive)	49 St.Geo	8703
S/370 SERVICES		
MANAGER		
Dave McNaughton	SF125	6281
INPUT/OUTPUT SUPERVISOR		
Derry Cox	SF113	7092
USER SERVICES SUPERVISOR		
Stan Yagi	SF113	7331
SYSTEMS SUPPORT SUPERVISOR		
Rein Mikkor	SF113	5058
PROGRAM ADVISORS	SF117	8599
INTERACTIVE TERMINAL SYSTEMS		
MANAGER		
Sam Goldfarb	49 St.Geo	3787
7094 SERVICES		
MANAGER		
Joyce Walton	BT1207	7094

JOB STATUS QUERIES:

SYSTEM/370	7373
7094	7094

INTERACTIVE TERMINAL SYSTEMS:

System Status	6234
APL	7200
ATS	7100
CPS	6200

CONVERSATIONAL REMOTE JOB ENTRY (CRJE)

2741: Tel: 7223 7381 7386

TTY: 7445

UTCC COMPUTER EQUIPMENT

(a) SYSTEM/370 MODEL 165

- located in SF 112
- provides General Purpose Job Stream, High Speed Job Stream and Conversational Remote Job Entry services
- 2048K bytes of core
- 1 drum
- 4 disk drives IBM (3330)
- 8 disk drives IBM (2314)
- 6 magnetic tape drives (4 9-track and 2 7-track)
- 6 display consoles
- 6 printers
- 5 card readers
- 1 card punch
- 7 remote batch terminals
- 1 paper tape reader
- CALCOMP plotter (11" and 30")

- OS/MVT with HASP

(b) SYSTEM/360 MODEL 65

- located in Room 333 McLennan Physical Laboratories
- provides Interactive Systems Service
- 1536K bytes of core
- 16 disk drives (2314)
- 2 9-track magnetic tape drives
- 1 printer
- 1 card reader
- 1 card punch
- 120 typewriter terminals

- OS/MVT with APL, ATS, and CPS

(c) 7094 II

- located in Room 1203 Burton Tower
- 32K words of core
- 1 disk
- 8 magnetic tape drives
- input/output via a 1401 computer

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